REMARKS

None of the claims have been amended, or cancelled. Claims 1-8, 11 and 12 are pending and under consideration. Claims 1, 11 and 12 are the independent claims. No new matter is presented in this Amendment.

REJECTIONS UNDER 35 U.S.C. §103:

Claims 1-5, 7, 8, 11, and 12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Mitanaga et al. (U.S. Patent No. 5,923,997) in view of Iwasaki (U.S. Patent No. 5,759,879).

Applicants respectfully traverse this rejection for at least the following reasons.

Regarding the rejection of independent claim 1, it is noted that claim 1 recites a display device comprising, amongst other novel features, a display region; a driving region; a **first plurality of thin film transistors in** the **display region**; a **second plurality of thin film transistors in** the **driving region**; wherein the **primary crystal grain boundaries** are **inclined to a first direction** of current flowing from source to drain of each of the first plurality of thin film transistors at an angle of -30° to 30° **and** the **secondary crystal grain boundaries** are **inclined to a second direction** of current flowing from source to drain **of** each of **the first plurality of thin film transistors**, **and** wherein the **primary crystal grain boundaries** are **inclined to** the **second direction** of current flowing from source to drain of each **of** the **second plurality of thin film transistors** at an angle of 30° to 150° **and** the **secondary crystal grain boundaries** are **inclined to** the **first direction** of the current flowing from source to drain **of** each of the **second plurality of thin film transistors**.

Applicants respectfully assert that the combination of Mitanaga and Iwasaki fails to teach or suggest each of these features.

In detail, the Office Action states that Mitanaga is silent with regards to the limitation of the secondary crystal grain boundaries inclined to a second direction of current flowing from source to drain of each of the first plurality of thin film transistors, and the secondary crystal grain boundaries are inclined to the first direction of the current flowing from source to drain of each of the second plurality of thin film transistors (page 3, lines 14-18).

The Office Action further states that one skilled in the art would reasonably contemplate

modifying the device of Mitanaga to include the claimed secondary crystal grain boundaries inclined to a second direction of current flowing from source to drain of each of the first plurality of thin film transistors, and the secondary crystal grain boundaries inclined to the first direction of the current flowing from source to drain of each of the second plurality of thin film transistors, as an obvious matter of design engineering as evidenced by Iwasaki.

The Office Action finally states that Iwasaki teaches two different sets of grain boundaries, the left hand side of FIG. 7A describes the first plurality of thin film transistors and the right hand side describes the second plurality of thin film transistors.

Applicants respectfully traverse this characterization for at least the following reasons. Iwasaki discloses a method for forming a thin-film transistor, wherein the number of grain boundaries which intersect a current path formed in the polycrystalline silicon film is decreased and the positions of the grain boundaries are controlled (column 1, lines 29-45). Iwasaki further discloses a first method for forming the thin-film transistor and refers to FIGS. 7A, 7B and 8A-8E for such teaching. FIGS. 8A-8E describe the method for forming the thin-film transistor and FIG. 7A is a cross-sectional view of the TFT obtained by the method illustrated in FIGS. 8A-8E. FIG. 7B is an upper view of the TFT obtained by the method illustrated in FIGS. 8A-8E. Therefore, Iwasaki discloses a method for forming a thin-film transistor wherein the **number of grain boundaries** is **reduced and** the **positions of** the **grain boundaries** are **controlled**. Accordingly, Iwasaki is not concerned nor does it teach or suggest the location and inclination of the different types of grain boundaries in the display and driving regions of the display device, as recited in independent claim 1.

Accordingly, Applicants respectfully assert that the rejection of claim 1 under 35 U.S.C. §103(a) should be withdrawn because neither Mitanaga nor Iwasaki, whether taken singly or combined, teach or suggest each feature of independent claim 1.

Furthermore, Applicants respectfully assert that dependent claims 2-5 and 7-8 are allowable at least because of their dependence from claim 1, and because they include additional features which are not taught or suggested by the prior art. Therefore, it is respectfully submitted that claims 2-5 and 7-8 also distinguish over the prior art.

Regarding the rejection of independent claim 11, it is noted that claim 11 recites a display device with a polysilicon substrate comprising, amongst other novel features, a driving region; a

plurality of **thin film transistors in the driving region**; primary crystal grain boundaries in the polysilicon substrate in the driving region; and secondary crystal grain boundaries in the polysilicon substrate in the driving region; **wherein** the **primary crystal grain boundaries** are **inclined to a direction of current flowing from source to drain** of each of the plurality of thin film transistors at an angle of 30° to 150° **and** the **secondary crystal grain boundaries** are **substantially parallel** to the current flowing from the source to the drain.

The Office Action recognizes that Mitanaga is silent with regards to the limitation of the inclination of the primary crystal grain boundaries and the direction of the secondary crystal grain boundaries (page 5, fourth paragraph and page 6, lines 1 and 2) and relies on Iwasaki for such teachings.

However, as noted above, Iwasaki discloses a method for forming a thin-film transistor wherein the **number of grain boundaries** is **reduced and** the **positions of** the **grain boundaries** are **controlled**. Accordingly, Iwasaki is not concerned nor does it teach or suggest the inclination or direction of the grain boundaries in the driving region of the display device, as recited in independent claim 11.

Accordingly, Applicants respectfully assert that the rejection of claim 11 under 35 U.S.C. §103(a) should be withdrawn because neither Mitanaga nor Iwasaki, whether taken singly or combined, teach or suggest each feature of independent claim 11.

Regarding the rejection of independent claim 12, it is noted that claim 12 recites a display device comprising, amongst other novel features, a display region; a driving region; a **plurality of thin film transistors formed in** the **display and in** the **driving regions**; primary and secondary crystal grain boundaries formed in the polysilicon substrate in the display region and in the driving regions; **wherein** the **primary crystal grain boundaries formed in** the **display region are inclined** to a direction of current flowing from source to drain at an angle of -30° to 30° **and** the **secondary crystal grain boundaries formed in** the **display region are substantially perpendicular** to the current flowing from the source to the drain; **and** wherein the **primary crystal grain boundaries** formed **in** the **driving region are inclined** to a direction of current flowing from source to drain at an angle of 30° to 150° **and** the **secondary crystal grain boundaries formed in** the **driving region are substantially parallel** to the current

flowing from the source to the drain.

As noted above, the Office Action states that Mitanaga is silent with regards to the limitation of the secondary crystal grain boundaries inclined to a second direction of current flowing from source to drain of each of the first plurality of thin film transistors, and the secondary crystal grain boundaries are inclined to the first direction of the current flowing from source to drain of each of the second plurality of thin film transistors (page 3, lines 14-18) and relies on Iwasaki for such teaching.

However, as also noted above, Iwasaki discloses a method for forming a thin-film transistor, wherein the number of grain boundaries which intersect a current path formed in the polycrystalline silicon film is decreased and the positions of the grain boundaries are controlled (column 1, lines 29-45). Accordingly, Iwasaki is not concerned nor does it teach or suggest the location and inclination of the grain boundaries in the display and driving regions of the display device.

As noted above, independent claim 12 recites not only the orientation and inclination of the grain regions but also the regions in which the grains boundaries are located in the display device.

Accordingly, Applicants respectfully assert that the rejection of claim 12 under 35 U.S.C. §103(a) should be withdrawn because neither Mitanaga nor Iwasaki, whether taken singly or combined, teach or suggest each feature of independent claim 12.

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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Date: 11/14/06

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